[Name of Document] ABSTRACT

The invention dispenses with calibration of the optical frequency of the light source and permits the use of many codes without increasing the transmission bandwidth used.   Let the optical frequency width of the light source be represented by FSR and the code length of every code be represented by FSR, the codes are made to be orthogonal to each other.   The optical intensity-frequency characteristic of an n-th optical code signal is set to $Cn(f) = (1 + \cos(2\pi sf/FSR + r\pi/2))/2$ (where s is an integer in the range from 1 to maximum number of codes/2, and r = 0 or 1) to provide orthogonality between the optical code signals.   Alternatively, optical frequency chips are sequentially assigned to chip sequences forming the optical code signals, the optical frequency of each chip "1" is output, and a filter is provided with an optical filtering characteristic of a concatenated code which is a repeated continuation of, for example a second-order Hadamard code word (0101) or (0011), and light emitted from the light source is passed through the filter to form the optical code signal.   An encoding optical frequency region 31 and a decoding optical frequency region 32 are so chosen as to cover a range of drift of the source frequency.   In Fig. 13, ΔF_1 and ΔF_2 indicate drifts of the source frequency.